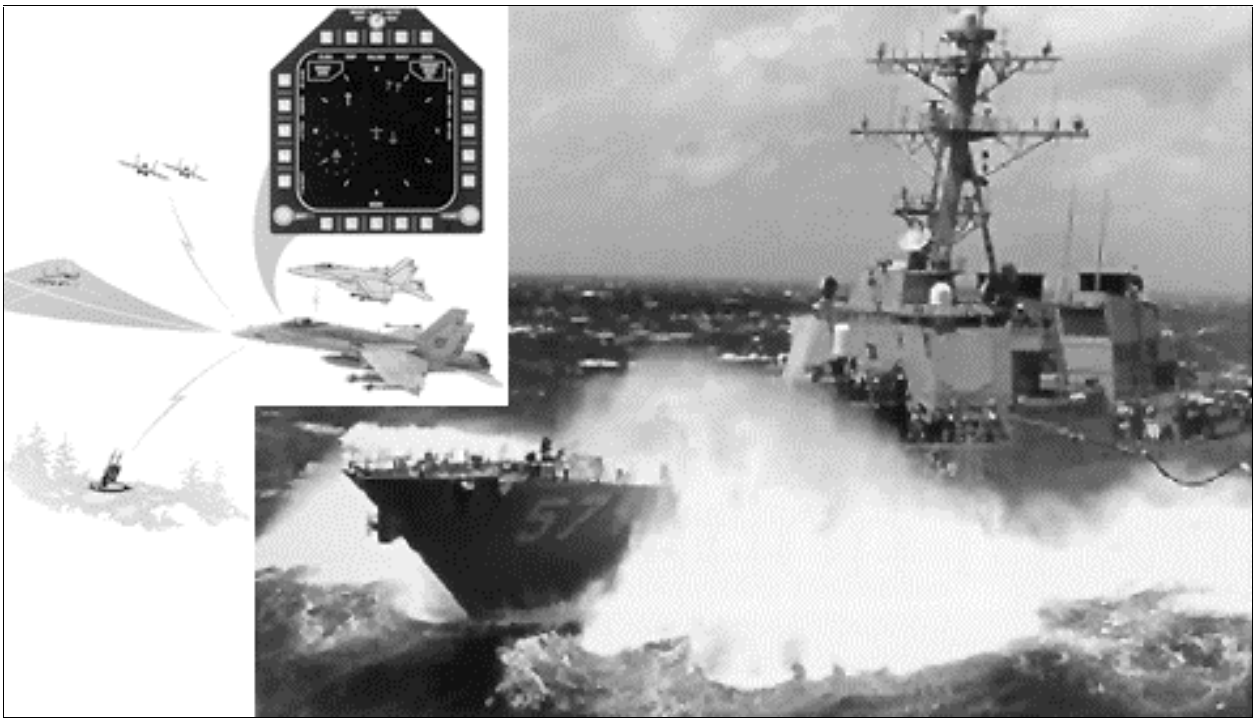
MULTIFUNCTION INFORMATION DISTRIBUTION SYSTEM LOW VOLUME TERMINAL (MIDS-LVT)



Joint ACAT ID (Navy Lead) Program

Total Number of Systems:	2358
Total Program Cost (TY$):	$1435.3M
Average Unit Cost (TY$):	$261K
Full-rate production:	2QFY01

Prime Contractor

MIDS Consortium (MIDSCO)

SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2010

The Multifunction Information Distribution System Low Volume terminal (MIDS-LVT) is a communications, navigation, and identification system intended to support key theater functions such as surveillance, identification, air control, weapons engagement coordination, and direction for all the Services and Allied forces. The system will provide jamming-resistant, wide-area communications on a Link-16 network among MIDS and Joint Tactical Information Distribution System (JTIDS) equipped platforms. MIDS is intended to improve joint interoperability, enhance battlefield situation awareness, ensure ***information superiority***, and support ***precision engagement*** of threats for our forces over the forces of our enemies in both benign and electronic warfare conditions. It is to be lighter, less expensive, and more reliable than the previous JTIDS terminal.

BACKGROUND INFORMATION

MIDS is being developed by an international consortium (MIDSCO), with representation from U.S. and NATO defense and aerospace companies. Platforms identified for MIDS-LVT integration include aircraft carriers, cruisers, F/A-18, F-16, EA-6B, and Airborne Laser. Additionally, MIDS-LVT is being integrated into Eurofighter-2000 and Rafale Allied platforms.

The first terminal delivery was April 1998. However, subsequent terminal deliveries are substantially behind schedule and the EMD contract is over budget. Certain key cards, such as the Exciter/Interference Protection Feature (IPF) card and the Data Processor card, are in short supply. This is due in part to inadequate quality assurance screening of parts at the manufacturing plants. Other contributing factors to schedule slips include diverted manpower and test resources needed to resolve technical issues discovered during developmental testing and added complexity and frequent changes in requirements caused by system development under the auspices of a multi-national consortium. Overall, the MIDS-LVT program has slipped by more than two years as compared to the schedule prior to 1997.

TEST & EVALUATION ACTIVITY

There was no operational test of MIDS-LVT in FY99. T&E activities continued to focus on approval of the MIDS Joint TEMP, the MIDS Capstone TEMP, and the various TEMP annexes for the Navy (ship and F/A-18) and the Air Force (F-16). DOT&E recommended that the MIDS program conduct separate multi-Service developmental tests and multi-Service operational tests for each MIDS-equipped platform, to evaluate joint interoperability before granting full-rate production of MIDS for that platform. DOT&E has been working with the OTAs from each Service to plan for such tests and make sure that plans are adequately reflected in the MIDS Joint TEMP and the Service annexes.

Terminal Contractor Developmental Test and Evaluation (CDT&E) is ongoing with functional performance, environmental, and electromagnetic interference testing largely completed. A laboratory terminal reliability development growth test is scheduled to begin 1QFY00 at the ENOSA plant in Spain.

Developmental testing is underway, including flight testing, on MIDS-LVT as integrated into the F/A-18C/D fighter aircraft. DT-IIA-3, hardware-in-the-loop laboratory system testing, started during 4QFY99. This DT connects host interface emulators, MIDS, and Class 2 JTIDS terminals in a Navy land-based wide-area network to evaluate message exchange and terminal performance under load conditions. The start of DT-IIA-5, planned to evaluate MIDS-LVT integration into the F/A-18C/D to include electronic warfare capabilities, was delayed and is scheduled for start in 1QFY00.

Planning for FY00 testing continues, including scheduling the Multi-Service Developmental Test (MS-DT) for MIDS-LVT as integrated into AEGIS ships for 1QFY00. OT to support a MIDS-LVT full-rate production decision is scheduled to begin 3QFY00.

Initial OT flights of MIDS-LVT in F/A-18s are scheduled from 1QFY00 to 3QFY00. COMOPTEVFOR conducted an initial operational assessment of MIDS-LVT in F/A-18s in August 1996 using man-in-the-loop simulators. Only limited MIDS functionality was simulated in this test. However, the results were sufficient to recommend continuation of MIDS integration into the F/A-18. The first OT of MIDS for ships (OT-IIB-1) occurs June 2000. This test will also use man-in-the-loop simulators. OT of MIDS-LVT onboard ships will occur December 2000. The MIDS-LVT Milestone III is scheduled for March 2001.

TEST & EVALUATION ASSESSMENT

During initial flight tests with F/A-18s, the MIDS Tactical Air Navigation (TACAN) card performed poorly. There were reported signal losses and incorrect lock up of bearing and range, incorrect beacon identification, and other associated problems. The Navy considers TACAN as mission critical equipment and must be working for operational aircraft. Improvements in software (tracking, interrogation, and antenna switching algorithms) and tracking filters have alleviated some of the problems.

Initial flight testing of new software and firmware indicates the MIDS LVT embedded TACAN deficiency is largely resolved. There appear to be some additional anomalies in the operation of this feature that must be resolved before entry into Initial Operational Test and Evaluation, however the TACAN capability now seems safe to continue DT flight test. Results from a MIDS LVT F/A-18 deployment to Hawaii during late 4QFY99 indicate the terminal correctly exchanged aircraft position and status messages within a flight of two MIDS LVT equipped F/A-18's.

There are two design and manufacturing issues that could adversely impact the test and evaluation program. First, the current MIDS-LVT software load incorporates all interfaces for all host aircraft implementations. The European bus protocols for EFA-2000 and Rafale are unique and do not follow a standard interface protocol used by U.S. aircraft. Memory and computer processor timing budgets are fully used to accommodate these interfaces. There is no additional memory or computer processing time for future expansion of MIDS-LVT functions. Second, limited availability of various MIDS-LVT cards has significantly delayed integration and test and evaluation activities.

DOT&E's identification of joint test opportunities and recommendations to combine testing among the various Service MIDS variants and leveraging ASCIET and Roving Sands resources will realize a cost savings of $1 million (which otherwise would have been required of the program). By combining tests in this way, MIDS will be evaluated in a more realistic and stressful joint environment than otherwise possible.

CONCLUSIONS, RECOMMENDATIONS, LESSONS LEARNED

Early assessment of joint interoperability through the use of remotely networked hardware-in-the-loop laboratories allows risk reduction of software implementation for various Link-16 messages in the host platform array. Initial joint interoperability certification tests of Link-16 implementation in the F-15C and the Patriot ICC, showed some errors in message implementation that are now being corrected.

The multi-national construct of the MIDS-LVT DT reinforces the need for early involvement by operational testers. While developing MIDS as a multinational program adds stability to funding, there are significant problems as well. Added complexity in dealing with multiple nations, contractors, and armed forces adds risk to schedule maintenance and further complicates manufacturing and resolution of terminal problems as they arise.